AMENDMENTS TO THE CLAIMS

18. (Previously Presented) An amplifier characterized by gain and output power comprising:

at least one gain medium;

at lease one pump supplying optical power into said gain medium;

a controller controlling said gain and said output power of said amplifier, said controller including a signal compression circuit to cover a wide dynamic range for optical input and output signals, so that resolution for at least one optical signal below -25dBm level is better than resolution for at least one optical above -25dBm level.

19. (Previously Presented) An amplifier characterized by gain and output power comprising:

at least one gain medium including rare earth-doped fiber;

at lease one pump supplying optical power into said gain medium;

a controller controlling said gain and said output power of said amplifier, said controller including a signal compression circuit to cover a wide dynamic range for optical input and output signals, so that resolution for at least one optical signal below -25dBm level is better than resolution for at least one optical signal above -25dBm level.

20. (New) The amplifier according to claim 18, wherein said gain medium includes at least one coil of rare earth doped fiber.

21. (New) The amplifier of claim 18, wherein said controller utilizes a logarithmic circuit.

22. (New) The amplifier of claim 18, wherein said controller utilizes electronic gain switch circuit.

23. (New) The amplifier of claim 20, wherein said controller utilizes a logarithmic circuit.

24. (New) The amplifier of claim 20, wherein said controller electronic gain switch circuit.

25. (New) The amplifier of claim 18, wherein said controller utilizes at least two feedback loops, one of said loops being a fast loop and another one of said feedback loops being a slow loop, wherein said slow loop operates in the range of 1 Hz to 10 kHz, and said fast loop operates in the range of 500 KHz to 10 Mhz.

26. (New) The amplifier of claim 25, wherein said fast loop is pump power control loop, and said slow loop is pump temperature control loop.

27. (New) The amplifier of claim 26, said slow loop is also temperature control loop of rare-earth doped fiber.

28. (New) The amplifier of claim 18, wherein said controller utilizes only a slow control loop, said slow control operating in the range of 1-1000 Hz, and does not control power transients.

29. (New) The amplifier of claim 19, wherein said controller includes (i) an A/D converter, and (ii) an electronic gain switch, said electronic gain switch detects the level of electrical signal corresponding to optical signal level and, when said electrical signal is lower then a predetermined amount, and multiples that signal by a predetermined constant, providing this multiplied signal to A/D converter.

30. (New) The amplifier of claim 19, wherein said controller includes (i) an A/D converter, and (ii) an electronic gain switch, and gain switch said electronic gain switch detects the level of electrical signal corresponding to optical signal level and, when said electrical signal is higher than a predetermined amount for a predetermined period of time, and lowers the electronic gain, provided by the electronic gain switch, so that the input to the A/D converter stays within its range, thereby preventing an overflow condition.

31. (New) An amplifier according to claim 20, wherein said electronic gain switch includes a circuit that utilizes hysteresis to prevent unwanted electronic gain switch oscillation.

32. (New) The amplifier of claim 18, further comprising A/D converter that can covert multiple analog signals simultaneously into multiple digital signals.

33. (New) The amplifier of claim 32, wherein one of said analog signals corresponds to optical input power and the other one of said analog signals corresponds to the optical output power.

34. (New) The amplifier of claim 18, wherein said controller incorporates an automatic gain control, coil temperature and pump temperature control system and a communication/alarm processing system.